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Usability testing with teens: Adapting human-centered design and UX methods

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ABSTRACT

Teens are a unique population with needs and communication styles that differ from adults and children. Methods in human-centered design were initially conceptualized with adults in mind, but these methods should be reexamined to include the needs of teens. In this experience report, we reflect on a project introducing teens to human-centered design and methods. As part of the project, our team created a website and series of videos. We conducted a usability evaluation on the videos and an accompanying website with teens to understand what worked well and how to make improvements. In this report, we discuss how we modified traditional usability methods and tailored them for a teen audience. We share takeaways including keep methods and tools lightweight and facilitation styles engaging and casual. We assert that modifying methods is a key consideration for conducting usability testing with any unique group of users.

CCS CONCEPTS

• Human-centered computing~Usability testing

KEYWORDS

Human-centered design, usability testing, teens

ACM Reference format:

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1 INTRODUCTION

Teens are a unique population with needs and communication styles that differ from adults and children. As teens develop their identities they learn and build relationships via communication with their peers [1]. Teens are highly social [2] and avid users of new technologies [3]. Teens also live in a technologically saturated landscape and consume a large amount of media [4]. Methods in human-centered design were initially conceptualized with adults in mind, but we believe these methods can be reexamined to include the needs of teens. Within the literature there are several studies that discuss teens and technologies within human computer interaction [2], [5]–[7]; however, how to understand and support teens within the human-centered design process is an area that remains underexplored.

We situate this work as embodying two trends in the field of technical communication. First, is the focus on design over documentation and an increased interest in user experience. The history of user experience and technical communication are inextricably intermingled [1], [2]. Recent trends in published research bears out this shift. Robinson, et al's. review of empirical literature concludes that the growth of UX and diversity of artifacts and methods “suggests UX is a vibrant and multifaceted discipline” [10, p.20]. Additional examples include special issues in *Communication Design Quarterly* that discuss new methods and approaches to UX [4] wearable technology [5], and cultural considerations for user experience design [6]. Second, we notice the broadening scope of UX that is paying attention to different types of people and considering how to include their perspectives in design. Some salient examples include studying extra-institutional individuals working outside of the bounds of traditional workplace hierarchies [7], women's perceptions of online dating apps [8], and participatory design of social media with members of the Deaf community [9].

While the field of technical communication moves to a more explicit focus on design and UX methods, we offer this experience report as a way to discuss our approach to researching and designing with teens, an often-overlooked population. Our hope is that by sharing our methodological

choices and reflections we can contribute to the rapidly changing and porous borders of UX as a field.

Building on our previous experience working with teens to introduce them to the human-centered design process [10] and engaging with teens in participatory design [11], we have first-hand experience of the nuances of working with teens to design and evaluate technology. In this experience report, we share our experience of evaluating instructional videos and a website with teens and report on how we modified existing usability evaluation methods for this unique audience. By sharing our experience, we hope to initiate a conversation about expanding existing UX and usability methods to account for the unique needs and communication styles of teens.

While this experience report primarily focuses on the modification for usability testing with teens, we position it as a call to all UX practitioners to reflect on how they choose and deploy specific methods. Working with new or previously underexplored groups of people, can be challenging. However, it provides an opportunity for practitioners to reflect on our own assumptions and long held beliefs about methods and existing practices. When faced with new audiences and contexts, we call on others to consider how methods may need to be iterated and expanded to enable participation in a way that is appropriate for the audience. Further, this work shows the importance of creating a climate that invites feedback and honors the needs of the people taking part in UX research.

The experience report is structured as follows. First, we provide details of the project, which includes a website and instructional videos specifically designed for teens to introduce them to the concept of human-centered design and to support their participation in a social robot design challenge. Second, we briefly review previous studies and literature that focus on teens as the primary audience for design and research in human-centered design, human computer interaction, and user experience. Third, we provide an overview of our approach to conducting usability evaluations with teens to explore the website and videos. We conclude by reflecting on the experience and identifying several areas for future research.

2 BACKGROUND: INTRODUCING TEENS TO HUMAN CENTERED DESIGN

The experience we detail in this paper is part of a larger project using human-centered design as a methodology to design a social robot aimed at understanding and addressing teen stress. The project includes teens in the design, assessment, and evaluation of the social robot throughout its development. The first stage in human-centered design is to investigate and understand the needs of the people who are the users of the product. While we had conducted preliminary participatory design activities with teens [11], we wanted to go further by having teens enact the human-centered design process themselves to design and evaluate a social robot prototype.

To engage teens in design, we created a Social Robot Design Challenge and invited seven high schools from an urban area in the Pacific Northwest of the United States to participate. The

goals of the challenge were two-fold. Our first goal was to teach teens the practice of human-centered design as an outreach and enrichment activity. We want to engage more teens in design with the goal of peaking their interest to pursue design in college or as a career and to use the methods of design thinking in their own daily lives. Our second goal was for teens to design their own social robots which could inform our larger research project. The teams were charged with the challenge of “How might we design a social robot to help teens with stress?” an example of a “How Might We” Statement commonly used in design practice [12]. To support teens, we created a series of instructional resources to use during the design challenge, including a website (<http://depts.washington.edu/designme/>) and a series of instructional videos about the human-centered design process (<https://bit.ly/2Hxb2qd>).

In order to evaluate how the materials would work for teens, we also followed the human-centered design process. First, we researched design guidelines for teens, created prototypes, and then evaluated those prototypes with representative teens and made changes and iterations based on their feedback. Next, we discuss designing for and with teens based on what we learned from the literature.

3 DESIGNING FOR AND WITH TEENS

In this section, we briefly review relevant studies and literature that focus on teens as the primary audience for design and research in human-centered design, human computer interaction, and user experience.

3.1 Teens are unique

Teens are immersed in a fast-paced, developmental process in which they no longer think like children but also do not yet think like adults. Although teens were previously thought to behave like adults when it came to usability testing [13], they are in fact a unique group. Teens have complex abilities such as abstraction and empathy [14]. However, teens are extremely diverse, individualized, and highly contextualized, making it very challenging to generalize their opinions and preferences [15]. In terms of design, teens offer valuable insights and have greater capacity for reflection in design than younger children [16],[17].

3.2 Designing for teens

While engaging teens in usability testing is essential for building teen-friendly products, they should also be included throughout the design process. Using human-centered design and designing and testing iteratively allows teens to influence the overall development of new technology. When designing for teens, it is imperative to include them in the process throughout, especially since it is “difficult to change the adult-centric paradigms of typically adult designers and developers” [23, p.99].

Regarding designing websites geared to teens, McCloskey, Loranger, and Nielsen, of the Nielsen-Norman Group published a report detailing 111 usability guidelines for designing teen friendly websites [18]. These guidelines are summarized in three areas: teens have (1) less sufficient reading skills, (2) less

sophisticated research strategies, and (3) dramatically lower levels of patience [19]. These three factors cause teens to give up far more quickly than adults when they do not find the information they are seeking. Therefore, designing clear, straightforward websites, with intuitive navigation is essential for a teen audience. Baily & Seals validated a subset of these guidelines for designing websites for teens in a study conducted on a health website for teens [20].

3.3 Usability testing with teens

While little research has looked closely at usability testing with teens, several studies have shown the effectiveness of using think-aloud protocol when conducting usability testing with children (ages 9-11 year olds) [21], (ages 13-14 year olds) [22]. Donker and Markopoulous compared think aloud protocol, an interview, and a questionnaire with 45 children ages 8-14 year olds and found the think-aloud protocol helps to identify the most usability problems [23]. Further, Als, et al, found that testing in acquainted dyads, meaning pairs of children who knew each other, was effective in finding a larger number of problems and being perceived to take less effort when compared to working in non-acquainted dyads [22]. Based on the effectiveness of think aloud protocols with children and early teens, we decided to use think aloud in our studies with some slight modifications.

4 USABILITY EVALUATIONS WITH TEENS: WHAT WE DID, WHAT WE LEARNED

In this section, we provide an overview of our approach to conducting usability evaluations with teens. We designed two sessions. The first examined a series of videos and the second a website. We describe the details of each session and how we modified traditional methods to engage teens.

4.1 Session 1: Group feedback on videos

In the first session, we screened instructional videos for a group of 21 teens and interspersed each video with interactive small group discussions and collected ratings based on a questionnaire including a 5-point Likert scale.

4.1.1 Participants. The group of teens who were engaged in this session were attending a monthly meetup for a STEM summer program. The monthly meetups occur throughout the academic year and consist of activities and exercises related to STEM. Based on our ongoing relationship with this program and its facilitators, we were invited to attend the meetup as a way to gain feedback on our materials while simultaneously teaching the attendees more about human-centered design and usability testing. There were 21 teens between the ages of 12 to 17 who took part in the session which lasted 60 minutes.

We were careful to make the data collection voluntary and anonymous. The teens were informed about the activity ahead of time and were either accompanied by a parent or had parental permission to attend. Further, we did not collect any identifying

information from the participants. We used anonymous feedback surveys and transcribed comments with no attribution.

4.1.2 Materials and procedures. During the session, we presented five videos about human-centered design, including an overview, research, ideation, prototyping, and testing. (see Figure 1).

The videos were created by our team using a commercial animation video tool. While designing the videos, our team had followed the human-centered design process. We conducted a comparative analysis and looked at other instructional videos about human-centered design. We also aimed to keep the needs of teens in mind, this lead to design decisions including keeping the video short (between 2-4 minutes in length), avoiding jargon, and ensuring the videos were lively and entertaining.

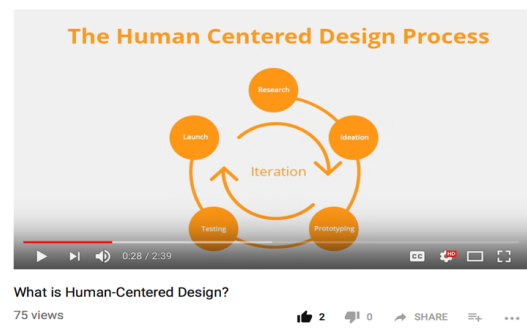


Figure 1: Screenshot of “What is human-centered design”?

When designing the session, we considered how to structure it in a way that was appropriate for teens. Our goal was to make the session engaging and social with minimal burden on participants. The event was communicated to attendees and their parents as both a way to introduce teens to human-centered design through screening of the videos, as well as to receive feedback on what they liked and didn’t like about the videos.

The session was kicked off by the program’s leader who introduced us to the teens. As customary in these sessions, the teens spent the first part of the evening eating and socializing. We wanted to fit into their existing social setting and also respect the casual and social atmosphere. We made choices like dressing casually and interacting with teens and parents before and after the sessions.

We first introduced an activity to generate discussion about technology that we find frustrating and conversely about tech that we appreciate (see Figure 2). Using this discussion with the teens as a starting point, we made the case that more teens should be engaged in the design of technology. We emphasized these themes to show an authentic interest in teens opinions and to hopefully charge them with a sense of agency as they gave feedback on the designs. Further we asked questions in a way that stimulated discussions between the teens as a whole.



Figure 2: Photos of our team leading the group session

After the introduction, we divided teens into five groups, with three to five participants per group. Each group had a facilitator from our team to take notes, listen to the discussion, and ask follow-up questions. Then we screened five videos in the order of the design process. Teens were asked to fill out a questionnaire immediately after watching each video and encouraged to discuss their opinions as a group.

1. After watching this video, do you feel that you understand the topic well?

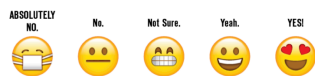


Figure 3: Image of the questionnaire using a visual Likert scale distributed to teens to rate each video

To gather feedback from individuals, we created a 3-item questionnaire. The first item was a visual Likert scale that used emoji-like faces to measure emotional valence from negative to positive (see Figure 3) [24]. The second item included questions about specific aspects of the videos, such as animation, sound, and visuals with simplified binary choices (like/dislike) for each item. We also included one open-ended question for more qualitative feedback. To gather group data, each facilitator led a short discussion with the group to listen to their feedback and also look for consensus and variation in the group. This conversational approach elicited a great deal of feedback. The group discussion allowed the teens to feel more comfortable expressing opinions in the presence of familiar peers. They also could share specific opinions as well as building on perspectives of the other members in the group. One limitation of this group discussion was, in some groups, quieter group members did not speak up against the strong opinions of others. The additional questionnaire helped to offset this limitation by gathering feedback in a more anonymous, individualized, format.

4.1.3 Emblematic findings and responses from teens. As a result of the video session, we learned that teens have high expectations for video content. Teens provided direct and critical feedback on several aspects of the videos including the production quality, audio voice-over quality, choice of music, and the animations. Although the teens found the content to be

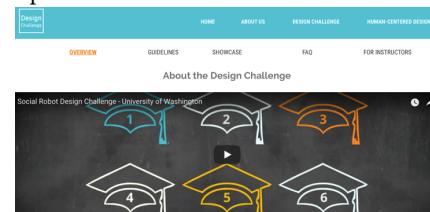
clear, the usability problems identified in the session were distracting and detracted from the user experience.

For example, the videos used free music as a background but teens commented how this recognizable music is ubiquitous on user-generated video, and they referred to other examples that also used this music. Such a familiarity decreased the credibility of the videos in the eyes of teens. Although most of the teens found the content itself was clear, their evaluations were still affected by the lack of perceived quality in the video deliverable. Teens liked the simplistic animations to describe human-centered design. We were unsure if teens might criticize this format as being too childlike. However, they commented that they liked this simplistic format and the animated characters, who were carefully chosen to represent diverse ethnic backgrounds. The narration of each video was also recorded by research team members who varied in ethnicity and gender.

The teens feedback revealed how valuable usability testing with teens for finding what makes a good user experience and what is important in design for this age group. Considering that teens are avid users of user-created media, design of user experience targeting teens should accommodate their standards to appropriately address their needs. Designing a study session that encouraged teens to voice opinions freely often produced harsh, yet important, criticism. We learned a great deal about what changes to recommend in order to make the videos more effective in teaching the human-centered design process to teens. Further, we believe having teens clustered together in groups where they were familiar with each other allowed us to create a more social and informal, and therefore less intimidating, setting where they felt comfortable to voice their honest opinions. In some groups, quieter teens were less likely to speak up which suggests that in future sessions, considerations of group size and the teens' familiarity with one another are important in order to encourage full participation.

4.2 Session 2: Usability studies on the design challenge website

In the second session, we conducted in-person, moderated, usability study sessions on the Design Challenge website (<http://depts.washington.edu/designme/>) (see Figure 4). The purpose of this activity was to evaluate the usability of the website from the perspective of our primary users – teens. We formulated a study plan including our objectives, user profiles, methodology and a script which included four tasks and a post-study questionnaire. We captured data in a spreadsheet during the sessions and distilled major findings and themes in an aggregated spreadsheet for the full research team.



Teams participating in the social robot design challenge will create a prototype of a social robot. You should design a robot that you can imagine living in your school. The robot's main purpose is to help students deal with stress.

Figure 4: Screenshot of the design challenge website

4.2.1 Participants. We conducted the usability sessions with 18 participants: 12 teens, 5 parents, and 1 teacher. Participants were recruited through convenience sampling by asking family, friends, and acquaintances. The study was conducted in Fall 2017 by our project team members. Again, we were careful to make the data collection voluntary and anonymous. We did not collect any identifying information from the participants. We used anonymous feedback surveys and transcribed comments with no attribution.

4.2.2 Materials and procedures. Each participant was asked to complete four tasks on the Design Challenge website to evaluate navigation, content, likes, and dislikes. The main areas of focus were: visual design, navigation, content and terminology, and, if there was time, the videos, which were embedded in the site. We used Quesenberry's 5e methodology to guide our evaluation using the five dimensions of usability: Effective, Efficient, Engaging, Error Tolerant, and Easy to Learn [25].

To modify these sessions for teens, we privileged conversational and open-ended think-aloud protocol over more formal, traditional protocols. We also intentionally designed the sessions to be short ranging in length from 15-30 minutes. We conducted the sessions with teens in their homes, rather than in a more formal lab setting.

4.1.3 Emblematic findings and responses from teens. As a result of the website sessions, we gathered a great deal of feedback to help improve the website. Teens struggled with navigation and finding key content on the site. Many of the comments revealed that the information architecture of the site was overly complex and could be simplified. Teens also struggled to understand some of the content on both the website and within the videos embedded in the website. For the most part, teens appreciated the visual design of the site. Their feedback helped our team make significant changes, additions and refinements of the site.

Using the open-ended think aloud protocol helped us to discover problems with branding, content, and terminology on the site. By asking open-ended questions such as, "What do you think is the purpose of the website?" during our tasks, we found that our participants were experiencing confusion on the home page about what the Design Challenge was all about. We also learned that much of the content was hidden, and teens were confused by the relationship between EMAR (the name of our larger project) and the Design Challenge itself.

Our four question post-study questionnaire also allowed the teens to give non-specific feedback on how we could improve the site. By asking teens to talk about their thoughts and challenges on the site, they often went deeper into the issues that occurred during the task-based questions. We were able to gather critical data by allowing teens to follow their own pace during the sessions.

The less formal conversational protocol allowed teens to express their opinions using the language that made the most sense to them. In removing the formality, the moderator could

allow the teen to guide the session. Using this less structured think-aloud protocol provided insight into the way the teens were interpreting the elements and architecture of the website. This was instrumental in finding areas where the user flow was confusing without leading the participants.

Another place that we made modifications was in reducing the number of tasks for the session. Our goal was to make the sessions as free from stress as possible. If an item was undiscoverable to the teens, unlike traditional usability testing, we did not press further. We also chose to conduct the sessions in a home environment as opposed to a lab setting. We found these choices and modifications to be successful because the low stress environment gave the teens the confidence to open up and share their experiences and opinions.

5: Reflections on adapting UX methods for teens

We conclude by reflecting on the adaptations we made to traditional usability methods to make them more teen-centric and discuss the advantages and disadvantages of these modifications.

In the adaptation of the video session, we particularly considered the cognitive and emotional aspects of the materials as evidenced by teens' responses. To reduce teens' cognitive burden and keep their attention as long as possible, we restricted the length of the materials when designing the overall structure of the videos and the questionnaire. To create an informal and engaging session, we adopted visual Likert scales that incorporated smiley faces [24] and used informal language such as "Like and Don't Like". We perceive that such adaptation yielded teens' active participation in evaluating the videos; based on the returned questionnaires, response rates were over 90 percent. On the other hand, we learned about teens' sensitivity and expectations to the multimodal aspects of the media. We found that teens had high expectations and specific criteria for evaluating the materials. Their expectations seemed to saturate their overall evaluation of the content. This led us to carefully consider the impact and quality of media when designing user experiences for teens.

The group discussions revealed clear advantages in promoting teens' expression of their own opinions which also facilitated peer communication. However, we assume that pre-established rapport among the teens in the same program may have boosted the positive aspects of the group discussion. Observing that less expressive participants in the group often missed the opportunity to speak up, the benefit of group discussions might be attenuated by lack of peer relationships. We would recommend placing teens of similar age groups or interests together; also taking time for introductions and social activities like ice-breaker exercises could be beneficial for group sessions to enable comfort and familiarity. We also recommend exploring multiple methods to collect feedback: questionnaires to capture individual experiences and facilitated discussion to capture group themes.

In the adaptation of the usability testing of the website, we believe an informal facilitation style coupled with short study sessions conducted in a familiar setting, such as a home or school rather than a lab are preferable. Keeping the session short and engaging is key.

Reflecting on both sessions, we argue that it is important to privilege the experience of the teens in the session over a more formal, and some might say rigorous, approach to data collection. Keeping methods and tools lightweight and facilitation styles engaging and casual is key when working with teens. In our experience, teens need little encouragement to be critical. The ones we have worked with have been more than willing to share exactly what they like and don't like. We believe it is more important to establish a relationship where teens are invited to speak and that their thoughts and opinions are valued. Especially in more formal settings, it may be important to emphasize and demonstrate that teen input will be extremely valuable in order to engage teens in ownership of the process and sharing their voice. Teens in both sessions expressed appreciation at being invited to participate and give feedback.

As we look back on the artifacts we created for these sessions, we were reminded of the importance of human-centered design in general. Our research team included undergraduates and graduate students including parents of teenagers. The experience of designing for teens and then conducting usability sessions with teens reminded us that our own assumptions about what teens may or may not like were often quite wrong. Further, while we followed best practices in designing for teens in the few sources we could find [19], these sources were not as informative as getting specific and contextually informed feedback from teens in our target audiences. This experience acts as a reminder that heuristics can only go so far and that there is no substitute for actively engaging people within the design process, especially teens who are growing up in a fast-paced, technological saturated landscape.

CONCLUSION

Teens are an important and unique population that require special attention. Our experience shows that while consulting guidelines geared to design for teens, there is no substitute for gathering feedback and insights from teens in person throughout the design process. We hope that the insights in this experience report can help other designers and researchers further explore ways to include teens in design. Further, methods are not static and need to be adapted and adjusted for unique audiences to enable participation and input for design.

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